

THE NEW ENGLAND SPECIES OF DICTYOSIPHON.

F. S. COLLINS.

THE genus *Dictyosiphon* was founded by Greville in 1830, on the *Conferva foeniculacea* of Hudson, which, for a long time, was the only species. There are now about ten species recognized, all but one inhabiting the North Atlantic and Arctic oceans, extending also a short distance into the North Pacific. The one exception, which, when better known, may have to be transferred to another genus, occurs in South Pacific and Antarctic waters.

The genus is characterized by a terete, more or less abundantly branched frond, growing by an apical cell, by whose rapid division and the repeated division of the segments cut off, the frond is formed; consisting of an inner layer of rather large, loose, colorless cells, elongated in the direction of the length of the frond, and an external layer of small, roundish or squarish colored cells. Unilocular sporangia, spherical or flask-shaped, are formed in the cortical layer, immersed or slightly projecting; plurilocular sporangia are unknown.

There are two subgenera, characterized thus:—

EU-DICTYOSIPHON.

Species of large size, slender, filiform, little or not at all gelatinous; branches and ramuli not attenuate at the base; cortical cells small; sporangia usually scattered, single.

COILONEMA.

Of smaller size; branches of first and second orders long, sub-simple, hollow, inflated, tapering to both ends, especially to the base; cells of the cortical layer large, rounded; sporangia in groups.

Not one of the characters given above, however, is always to be depended on; indeed, in a good proportion of individual plants, some characters of one subgenus will be found combined with characters of the other.

Specific limitations are vague; very distinct types can be selected, but all possible intermediate forms are found, and the determination of individual specimens is often a matter of considerable difficulty, and sometimes impossible. The following key will only approximately indicate the New England forms:

Frond with stout percurrent axis and simple branches of nearly uniform length,
D. Macounii Farlow.

Frond quite slender, simple or with very few branches,
D. Ekmani Areschoug.

Fronde repeatedly branched,

All branches nearly the same size as the main stem.

Branches not contracted at the base, *D. hippuroides* (Lyng.) Kuetz.

Branches contracted at the base,

D. hippuroides var. *fragilis* (Harv.) Kjellm.

Branches of successive orders smaller and smaller, the ultimate very slender,

All except the oldest parts beset with uniformly short ramuli,

D. hispidus Kjellman.

No definite short ramuli; branches not contracted at base,

D. foeniculaceus (Huds.) Grev.

No definite short ramuli; branches contracted at base,

D. foeniculaceus var. *Americanus* Collins

It will be noticed that no account has been made of color, although nearly all descriptions speak of *D. hippuroides* as being dark brown, *D. foeniculaceus* and *D. hispidus* light brown. The writer's experience is that in the living plant age and exposure have more influence than have specific differences; while in the dried specimens the manner of preparation may make more difference than anything else.

Altogether the most common form in Europe is *D. foeniculaceus*, the type of the genus; but in New England it seems to be not very abundant, at least in its typical form. The main stem bears numerous alternate branches, each bearing branches of the second order, followed by third and other orders, each order being more slender than the preceding, the ultimate very fine. Occasionally the main stem and some of the larger branches are hollow, otherwise all are solid.

In Southern New England the typical form is seldom found, but its place is taken by what appears to be an undescribed variety, for which I propose the name var. *Americanus*. The contracted bases of the branches, the often longitudinally seriate cortical cells, and the sporangia frequently in groups, show a tendency to the subgenus *Coilonema*, while the size of the plant, the branches of several orders growing successively more slender, agree with typical *D. foeniculaceus*. In habit it resembles *Striaria attenuata*, Grev., more than it does typical *D. foeniculaceus*. The northernmost point at which it has been found is at Weymouth, Mass. (F. S. C.), in the warm water colony established there. It is the common Dictyosiphon at Newport, R. I. (Mrs. W. C. Simmons), and at Bridgeport, Conn. (Isaac Holden). South of New England it extends at least as far as Atlantic City, N. J. (S. R. Morse). It occurs chiefly on *Phyllitis fascia* (Fl. Dan.) Kuetz., in less frequency on *Scytosiphon lomentarius* (Lyng.) Ag., and occasionally on other algae; it is found chiefly in spring.

The plant which in northern New England has passed largely for *D. foeniculaceus* appears to be rather *D. hispidus* Kjellm. In general habit it is not unlike the older species; the branching is abundant and pretty regularly alternate, and the younger parts are uniformly beset, often quite densely, with subulate or filiform ramuli, two or three cm. long. These appear to be of a distinct class from the normal branches, and of limited growth, remaining of the same dimensions, while normal branches continue to grow and branch indefinitely. The writer has collected this species at various points from Nahant, Mass., to Mount Desert, Maine, and it probably continues along the Canadian shore, as it occurs in Greenland, Spitzbergen and Norway. It seems to prefer rocky pools on rather exposed coasts, and grows by preference on *Chordaria flagelliformis* (Fl. Dan.) Ag. It is in its best condition in July and August.

D. hippuroides (Lyng.) Kuetz, like the last species, has often passed under the name of *D. foeniculaceus*, and it must be confessed that it is not easy to distinguish the two. *D. hippuroides* is a coarser plant, less branched, the branches of various orders more nearly of the same size and less tapering. Our plant, as compared with the European forms, is of looser structure, and has a larger central cavity. It is our largest species, and in favorable situations may reach a meter in length. What appears to be a reduced form, not over a decimeter in height, is found at Newport, R. I. (Mrs. Simmons). There is no other record of its occurrence south of Nahant, but from that point north it is common, usually growing on *Chordaria flagelliformis*, occasionally on other algae.

D. hippuroides var. *fragilis* (Harv.) Kjellman, has the branches of the first order of nearly the same diameter throughout, except at the base, where they are distinctly constricted; branches of higher order than the first are few; the general habit is that of the subgenus *Coilonema*, and extreme forms also resemble *D. Macounii* Farlow. It is common at Marblehead Neck, Mass., in company with the type, both on *Chordaria flagelliformis*.

In the typical form of *D. Macounii* Farlow there is a stout main axis like a Scytosiphon, and similarly hollow; from this issue numerous branches of nearly uniform length, and seldom divided or branched; they are either straight or incurved, and taper to both ends. This form occurs in the Gulf of St. Lawrence; only a reduced form, approximating *D. hippuroides*, occurring in New England. This was

found by the writer at Mount Desert, Maine, in tide pools, in company with *D. hippuroides*, in July.

D. Ekmani Areschoug is a smaller plant than any of the species yet named, the fronds seldom exceeding five cm. in length. They are normally simple, but sometimes have a few short branches. They are very slender, in the American form of nearly uniform diameter, while in the European form they are considerably larger in the middle than at either end. The sporangia are full as large in this species as in the others, somewhat larger in the American than in the European form. It is a plant of the upper tide pools, growing on *Scytosiphon lomentarius*, which it covers quite densely. It is common about Nahant in spring and early summer, extending northeast to the boundary, and is found also at Yarmouth, N. S. (Herb. Farlow.)

Though these are all the forms that occur within our limits, it may not be amiss to mention two forms that occur in Northern Europe and Greenland, and that may be expected to be found on the coast of Maine. *D. foeniculaceus* var. *flaccidus* Kjellm. has stem and main branches tubular, larger than in the type, but soft and easily torn. *D. corymbosus* Kjellm. has a short axis and long, subequal, nearly simple branches, not constricted at the base.

The following summary will give the more important references for the species named, and some synonymy: —

D. FOENICULACEUS (Huds.) Grev.

Greville, *Algae Britannicae*, p. 56, Pl. VIII.

Farlow, *N. E. Marine Algae*, p. 66.

Phycotheca Boreali-Americana, No. 673.

Conferva foeniculacea Hudson, *Flora Anglica*, p. 594.

var. **FLACCIDUS** (Aresch.) Kjellm.

Kjellman, *Algae of the Arctic Sea*, p. 268.

D. flaccidus Areschoug, *Observationes Phycologicae*, Part 3, p. 31.

var. **AMERICANUS** Collins.

Phycotheca Boreali-Americana, No. 674.

D. HISPIDUS Kjellm.

Kjellman, *Algae of the Arctic Sea*, page 270.

Phycotheca Boreali-Americana, No. 677.

D. foeniculaceus subspecies *hispidus* Kjellman, *Spetsbergens*

Thallophyter, Part 2, p. 39, Pl. II, fig. 1.

D. HIPPUROIDES (Lyng.) Kuetz.

Kuetzing, *Tabulae Phycologicae*, Vol. VI., p. 19, Pl. LII, fig. 2.

Farlow, N. E. Marine Algae, p. 66.

Farlow, Anderson & Eaton, Alg. Am.-Bor. Exsicc., No. 95.

Phycotheca Boreali-Americana, No. 675.

Scytosiphon hippuroides Lyngbye, Hydrophytologia Danica, p. 63,
Pl. XIV, B.

var. FRAGILIS (Harv.) Kjellm.

Kjellman, Algae of the Arctic Sea, p. 268.

Phycotheca Boreali-Americana, No. 676.

D. fragilis Harvey in Kuetzing, Species Algarum, p. 485; Tabulae
Phycologicae, Vol. VI., p. 19, Pl. LII, fig. 1.

D. MACOUNII Farlow.

Farlow, Bulletin Torrey Bot. Club, Vol. XVI., p. 11, Pl.
LXXXVII, fig. 1.

D. EKMANI Aresch.

Areschoug, Observationes Phycologicae, Part 3, p. 52.

Phycotheca Boreali-Americana, No. 533.

D. CORYMBOSUS Kjellm.

Kjellman, Algae of the Arctic Sea, p. 267, Pl. XXVI.

The writer is indebted to Dr. L. Kolderup-Rosenvinge, of Copenhagen, for specimens of Dictyosiphon from Europe and Greenland, and for notes as to the differences between the American and the European forms.

ASTER CONCINNUS IN NEW ENGLAND.

L. ANDREWS.

EARLY in September, 1898, while botanizing with Mr. C. H. Bissell along the foot of the precipitous cliffs of Meriden Mountain in Connecticut, we found, growing with the little fern, *Asplenium Trichomanes*, in the crevices of the rocks, a peculiar form of Aster. As these rock-crevices are usually very dry and devoid of soil, rarely supporting more than a small amount of vegetation, the occurrence of these Asters was very noticeable. A few specimens were collected, and, after drying, were examined, but with very unsatisfactory results.

Later, in making up a package for the New England Botanical Club, one of these strange Asters was included. The following portion of a letter, dated June 9, 1900, from Mr. M. L. Fernald, phanerogamic curator of the club herbarium, gives the result of his investigation.